

BEETLE ECOLOGY (5)

By JOHN R. DIBB, F.R.E.S.

Wollaton, Nottingham

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Reference to our "Schedule of Field Data", providing it contains the information called for under the various headings, will give to the coleopterist a number of possible bases upon which to build his bionomic classification. For the purpose of illustration we are confining these notes to that portion of the schedule which deals with habitat, both particular and general. For example, should we find a species of the Carabid genus *Bembidion* running upon moist mud which forms the bank of a mountain stream, the particular habitat of the specimen in question is moist mud, with description of its composition, and the general habitat—the banks of a mountain stream, etc.

It is not possible within the compass of these short notes to give a comprehensive list of adult beetle habitats and it will be evident that it is at present the beetle ecologist's purpose to extend the already known habitats of that proposition of the species investigated to include more and more of the species until all indigenus forms are covered and in so doing, add to our knowledge of natural habitats.

In order to place each group of species which have a common habitat within a single definition, the different habitats are defined by descriptive terms, all of which have the common ending—ICOLES, e.g., the species associated with dung, STERCORICOLES, those with flowing waters, FLUVICOLES, and so on. A broad division of habitats can be made as follows:

A. On or in SoilSOLICOLES

B. On or attached to Plants.....PHYTICOLES

C. Associated with Animals (including man)
ANIMALICOLES

D. In WaterAQUATICOLES

E. At high AltitudesALTICOLES

Each of the above are further divisible into lower habitat-group categories which can be illustrated by taking division B above.

DIVISION B—PHYTICOLES

1. On trunks of treesTRUNCICOLES

2. In or under the bark of treesCORTICICOLES

3. In the wood of tree trunks and boughs
LIGNICOLES

5. On stems and fronds of flowering plants,
grasses and fernsHERBICOLES
6. On flowers and blossoms.....FLORICOLES
7. Upon plant rootsRADICOLES
8. On decaying vegetables and food
refuseDETRITICOLES
9. On plant gallsGALLICOLES
10. In mossMUSCICOLES
11. In fruitsFRUCTICOLES
12. On or in fungiFUNGICOLES

From the foregoing it will be realised that this method of classification through the introduction of bionomic divisions lends itself to great extension and development as further ecological information comes to hand, for the above mentioned primary and secondary habitat group divisions are themselves capable of being added to and expanded as our knowledge of the subject widens. When we consider that similarly extended methods of bionomic classification can be worked out in connection with behaviour, food preferences, soil constitution, conditions relating to shelter, temperature and humidity to mention but a portion of the factors involved, we begin to appreciate the wide field of investigation opening up from the new approach.

In investigating the beetle fauna of a particular local area upon the ecological basis, we arrive at a stage when the species within that area are almost, if not all recorded and further, every species has been allocated from the schedule of field data to its lowest named bionomic division or habitat group. The specimens falling within each of the above mentioned divisions can then be segregated each batch representing an area.

It is at this stage that we can, with advantage, utilize the taxonomic characters to separate the species, and we shall find that in addition to broadening our knowledge of the living beetles, this ecological approach will, to a large extent, reduce the difficulties of determining the species. The reason for the simplification of the work of determination is due to the comparatively small number of species which have to be identified within each bionomic division. For illustration we take the case of the fairly extensive Nitidulid genus *Epuraea*. Some species of the genus are known to live in flowers and blossoms, and others in fungi. To the former type we apply the bionomic term Floricoles and to the latter Fungicoles. Now a key to the separation of the species based solely upon structural characters would be required

to include all the species of the genus occurring in the zoogeographical area and would necessarily be of considerable complexity owing to the close relationships of the component species of this genus. When we know, however, that the natural habitat of say one-third of the species within the genus *Epuraea* is fungus, and also that the specimen we have for determination had been found in that pabulum, our task would be at once reduced by two-thirds through knowledge of the single fact pertaining to habitat alone.

We must remember though, that it is not until the fathering of ecological detail reaches the stage where we possess the required information attaching to a very large proportion of the representative species within each genus that the portion is reached when a really big step forward can be made through bringing into use the expanding knowledge of the bionomics of the beetles. There are firm grounds for the belief, however, that the old methods of species determination have commenced to change and that in due course they will embrace as much bionomic data provided by the ecologist in the field, as taxonomic, provided by the systematist alone.

In a previous paper the writer referred to the Eco-taxonomic approach to the study of beetles which is the method which has been a little more extensively discussed in the foregoing notes, and it is suggested that the term Eco-taxonomy is the appropriate one for the subject of classification and determination through the utilization of both taxonomic and ecological data.

The trend is thus developing to wed the ecological approach to the taxonomic, which should appeal to all ecologists by virtue of the inherent nature of the principles of ecology. Such a synthesis of systematic coleopterology and ecology can only result in a more valuable contribution to Natural Science as a whole.

NEWS

Professor Melville H. Hatch of the University of Washington has been spending most of his research time on his "Handbook of the Coleoptera of the Pacific Northwest." He has completed the preliminary manuscript of Part 1, suborder Adephaga—over 600 species—and hopes to have it checked and ready for publication by winter.

—From Dept. Zool. Newsletter.

Dr. Elwood C. Zimmerman of Hawaii spent a few days in early June at the U. S. National Museum. Dr. Zimmerman is enroute to the British Museum for the purpose of studying beetles types. He plans to spend a year and a half in England.